UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,549	04/13/2007	Masahide Matsuura	294551US0PCT	8443

22850 7590 05/18/2010

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
YANG, JAY	

ART UNIT	PAPER NUMBER
1786	

NOTIFICATION DATE	DELIVERY MODE
05/18/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/588,549	MATSUURA ET AL.	
	Examiner	Art Unit	
	J. L. YANG	1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Applicant's Arguments/Remarks Made in an Amendment filed 02/12/10.

Claim Rejections – 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

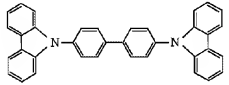
2. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-8, 10-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being anticipated by Tsuboyama et al. (JP 2002-343572 A) in view of Tomita et al. (US 2006/0141284 A1) as evidenced by Thoms et al. (JP 2003-317966 A).

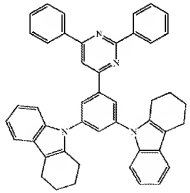
Regarding Claims 1, 3-8, 10-13, 15-19, 21, and 22, Tsuboyama et al. discloses an organic EL device comprising a cathode (11), an electron-transporting layer (16), a light-emitting layer (12a), a hole-transporting layer (13), an anode (14), and a substrate (15) in that order (Drawing 1). Tsuboyama et al. discloses the construction of flat panel

displays that comprises such organic EL devices ([0069]). Tsuboyama et al. discloses the use of CBP as host material for the light-emitting layer and $Ir(ppy)_3$, a phosphorescent metal complex, as the light-emitting dopant at 6% ([0104], [0018]). Tsuboyama et al. discloses the use of Alq_3 as material for the electron-transporting layer ([0113]). This would result in the triplet energy gap of the CBP host material of the light-emitting layer = 2.67-2.81 eV as evidenced by Thoms et al. (Table 1). The structure of CBP is shown below:



However, Tsuboyama et al. does not explicitly disclose a host material such that I_p(electron-transporting material) - I_p(host material) is between -0.2-0.4 eV.

Tomita et al. discloses the following material that can be used as host material ([0056]) or as an electron-transporting material in the electron-transporting layer ([0012]) for an organic EL device:



(page 12). Tomita et al. further discloses compounds represented by general formulas (1)-(13) that encompassed the above compound have triplet energy gaps from 2.5-3.3

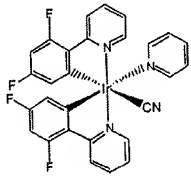
eV ([0057]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the above highly similar compound to produce ETM_No. 1 as defined in the present application such that I_p = 5.6 eV such that the difference = $I_p(Alq_3)$ – I_p(ETM_No. 1) = 5.7 – 5.7 = 0.0 eV. The motivation is provided by the fact that the difference between the above compound and ETM_No. 1 rests only on the conjugation of the fused phenyl ring, in addition to the fact that nitrogen-containing carbazole groups are widely known (as in the case of CBP) to serve as efficient hole-transporting groups in host material. It would further have been obvious to one of ordinary skill in the art at the time of the invention to substitution the material as disclosed by Tomita et al. as host material in the light-emitting layer and/or electron-transporting material in the electron-transporting layer of the organic EL device as disclosed by Tsuboyama et al. The motivation is provided by the fact that the compound as disclosed by Tomita et al. is a known material capable of acting as host material in a light-emitting layer or as effective electron-transporting material, capable of producing an organic EL element with high current efficiency with low electric voltage (abstract).

Regarding Claims 2 and 14, The triplet energy gap of $Ir(ppy)_3$ = 2.4 eV as evidenced by Tsuboyama et al. 2 (col. 7, lines 50-52) while the triplet energy gap and ionization potential of Alq_3 = 2.51 and 5.7 eV, respectively, as evidenced by Mishima et al. (Table 2, page 13) and the present application (page 37). This would result in an organic EL device in which the triplet energy gap of the electron-transporting material > triplet energy gap of the metal complex compound of the light-emitting layer.

3. Claim 20 is rejected under 35 U.S.C. 103(a) as being anticipated by Tsuboyama et al. (JP 2002-343572 A) in view of Tomita et al. (US 2006/0141284 A1) and Lamansky et al. (US 2002/0182441 A1).

Tsuboyama et al. in view of Tomita et al. discloses the organic EL device according to Claim 1. However, they do not disclose a phosphorescent complex with CN as ligand.

Lamansky et al. discloses the following light-emitting dopant:



(Fig. 7e, sheet 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the above complex for $Ir(ppy)_3$ in the light-emitting layer of the organic EL device as disclosed by Tsuboyama et al. in view of Tomita et al. The motivation is provided by the fact that the dopant as disclosed by Lamansky et al. too is a phosphorescent iridium complex with a particular spectral profile in addition to the fact that Tsuboyama et al. allows for a wide variety of phosphorescent dopants such that the substitution would have been predictable with a reasonable expectation of success.

4. Claim 23 is rejected under 35 U.S.C. 103(a) as being anticipated by Tsuboyama et al. (JP 2002-343572 A) in view of Sakaguchi et al. (US 6,703,146 B1).

Tsuboyama et al. discloses an organic EL device comprising a cathode (11), an electron-transporting layer (16), a light-emitting layer (12a), a hole-transporting layer (13), an anode (14), and a substrate (15) in that order (Drawing 1). Tsuboyama et al. discloses the construction of flat panel displays that comprises such organic EL devices ([0069]). Tsuboyama et al. discloses the use of CBP as host material for the light-emitting layer and $Ir(ppy)_3$, a phosphorescent metal complex, as the light-emitting dopant at 6% ([0104], [0018]). Tsuboyama et al. discloses the use of Alq_3 as material for the electron-transporting layer ([0113]). This would result in the triplet energy gap of the CBP host material of the light-emitting layer = 2.67-2.81 eV as evidenced by Thoms et al. (Table 1). However, Tsuboyama et al. does not explicitly disclose a host material such that I_p(electron-transporting material) - I_p(host material) is between -0.2-0.4 eV.

Sakaguchi et al. discloses the use of a host material 9,10-bis[4-(2,2-diphenylvinyl)phenyl]anthracene with an I_p = 5.70 eV and bis(2-methyl-8-quinolinol)(1-phenolate)gallium with I_p = 6.03 eV as electron-transporting material (and thus resulting in a difference of 0.33 eV). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the host and electron-transporting material for the corresponding materials in the respective layers in the organic EL device as disclosed by Tsuboyama et al. The motivation is provided by the fact that the materials as disclosed by Sakaguchi et al. are known host/ET material that can assist in the production of an organic EL device with improve luminescence efficiency (abstract), in

addition to the fact that Tsuboyama et al. allows no strict limitations as to the nature of the host/ET materials, rendering the substitutions predictable with a reasonable expectation of success.

Response to Arguments

1. Applicant's arguments with respect to the ionization energy of CBP (6.1 eV vs 5.7 eV) have been fully considered and are persuasive. The previous rejection of Claim 1 as being unpatentable over Tsuboyama et al. has been withdrawn. Nevertheless, new grounds of rejection have been made as applied to Tsuboyama et al. in view of Tomita et al. as evidenced by Thoms et al. as shown above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. L. YANG whose telephone number is (571)270-1137. The examiner can normally be reached on Monday to Thursday from 8:30 am to 6:00 pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on (571)272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786

/J. Y./
Examiner, Art Unit 1786